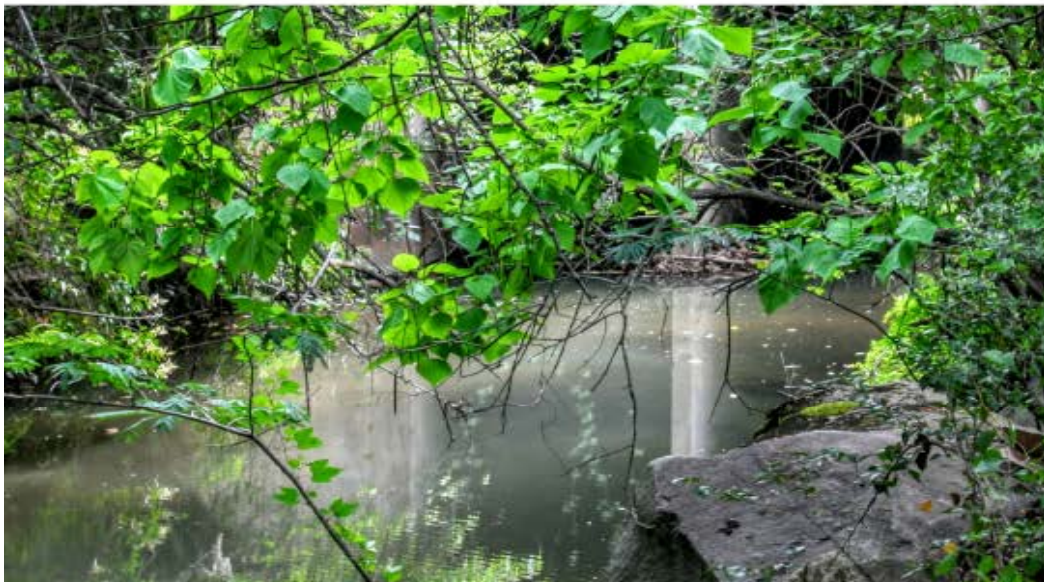


City of Raleigh  
Engineering  
Services  
Department



## Stormwater Management



Public Meeting –  
North Ridge Storm Drainage  
Improvements Phases IV & V

March 20, 2018



# Project Team



## ■ City of Raleigh:

- Carrie Mitchell, PE – Senior Engineer/Project Manager
- Veronica High, PE – Stormwater Administrator – Infrastructure Projects
- Kristin Freeman – Communications Analyst
- Melanie Leach – Real Estate Analyst
- Susan Mullins – Sr. Real Estate Analyst

## ■ Brown and Caldwell:

- Ryan Sprowl, PE – Project Manager
- Ben Nash, PLA – Stream Designer
- Brenan Buckley, PE – Project Director



# Meeting Overview



- Project Purpose, Objectives, and Prioritization
- Schedule
- What to Expect During Construction
- General Q&A and Breakout



# Project Purpose & Objective



- Alleviate flooding to homes and roads by designing improvements that meet the City of Raleigh Level of Service (10-year, 24-hour storm event = 5.28 inches)
- Protect public infrastructure
- Reduce sediment loads from streambank erosion
- Prioritize project based on Raleigh Stormwater criteria



# Project Prioritization



- CIP Project Prioritization Criteria
  - ✓ Public safety and public health
  - ✓ Flood hazard reduction benefits
  - ✓ Regulatory mandates and compliance
  - ✓ Water quality benefits
  - ✓ Watershed management benefits
  - ✓ Stormwater infrastructure asset management benefits
  - ✓ Community support and implementation complexity
  - ✓ Resource leveraging opportunities
  - ✓ Indirect community benefits



# Project Prioritization



## ■ North Ridge Phase IV & V Project Prioritization Results

Project Area	Prioritization Score
Rainwood Lane	53.75
Audubon Drive	44.88
Knights Way	41.90
Stream Stabilization	37.36
Wagram Court	28.89



# Rainwood Lane





# Rainwood Lane



## Current Conditions

- 24-inch stormwater pipe through the drainage system
- Road and structural flooding (1201/1208 Rainwood Lane)

## Proposed Improvements for 10-year Level of Service

- Keep 24-inch pipe along Rainwood Lane active
- Install parallel system consisting of 48- and 54-inch pipe along Rainwood Lane
- Replace 24-inch pipe with 4-foot by 4-foot box culvert to current outfall (area where water flows out of the pipe)



# Rainwood Lane Flooding



Tropical Storm Alberto

Brown AND Caldwell



# Rainwood Lane Flooding



Tropical Storm Alberto

Brown AND Caldwell



# Audubon Drive





# Audubon Drive



## Current Conditions

- 36-inch stormwater pipe through the drainage system and limited inlet capacity
- Road and yard flooding (1300 Sadler Court)
- Significant erosion behind the existing outfall

## Proposed Improvements for 10-year Level of Service

- Replace 36-inch pipe system with 42- and 54-inch pipe to current outfall
- Install double catch basins along Audubon Drive
- Replace stormwater drainage system outfall on Audubon Drive and stabilize the outfall to the stream to avoid erosion



# Audubon Drive Flooding



May 2013 Storm Event



# Audubon Drive Flooding



April 2017 Storm Event

Brown AND Caldwell



# Knights Way





# Knights Way



## Current Conditions

- 48-inch stormwater pipe through the drainage system
- Road and structural flooding (1321 Knights Way)

## Proposed Improvements for 10-year Level of Service

- Replace 48-inch pipe system with a 5-foot by 10-foot box culvert



# Knights Way Infrastructure



Existing stormwater pipe



# Knights Way Infrastructure



Existing stormwater pipe at the  
end of the system



# Stormwater Infrastructure - Example



New stormwater pipe being constructed on Haymarket Lane



Brown and Caldwell



# Stormwater Infrastructure - Example



New stormwater pipe on  
Haymarket Lane



Brown AND Caldwell



# Stormwater Infrastructure - Example



New stormwater pipe on  
Haymarket Lane





# Stormwater Infrastructure - Example



Stormwater pipe on Haymarket Lane during rain event



# Stream Stabilization





# Stream Stabilization



## Current Conditions

- Streambank erosion along multiple properties
- Stream is actively transitioning due to the upstream watershed conditions

## Proposed Improvements for 10-year Level of Service

- Modify the stream cross section to accommodate expected flows
- Stabilize stream to eliminate erosion, protect yards along the stream, and protect sanitary sewer infrastructure and service laterals



# Stream Stabilization – Project Area



Properties with Stream Erosion



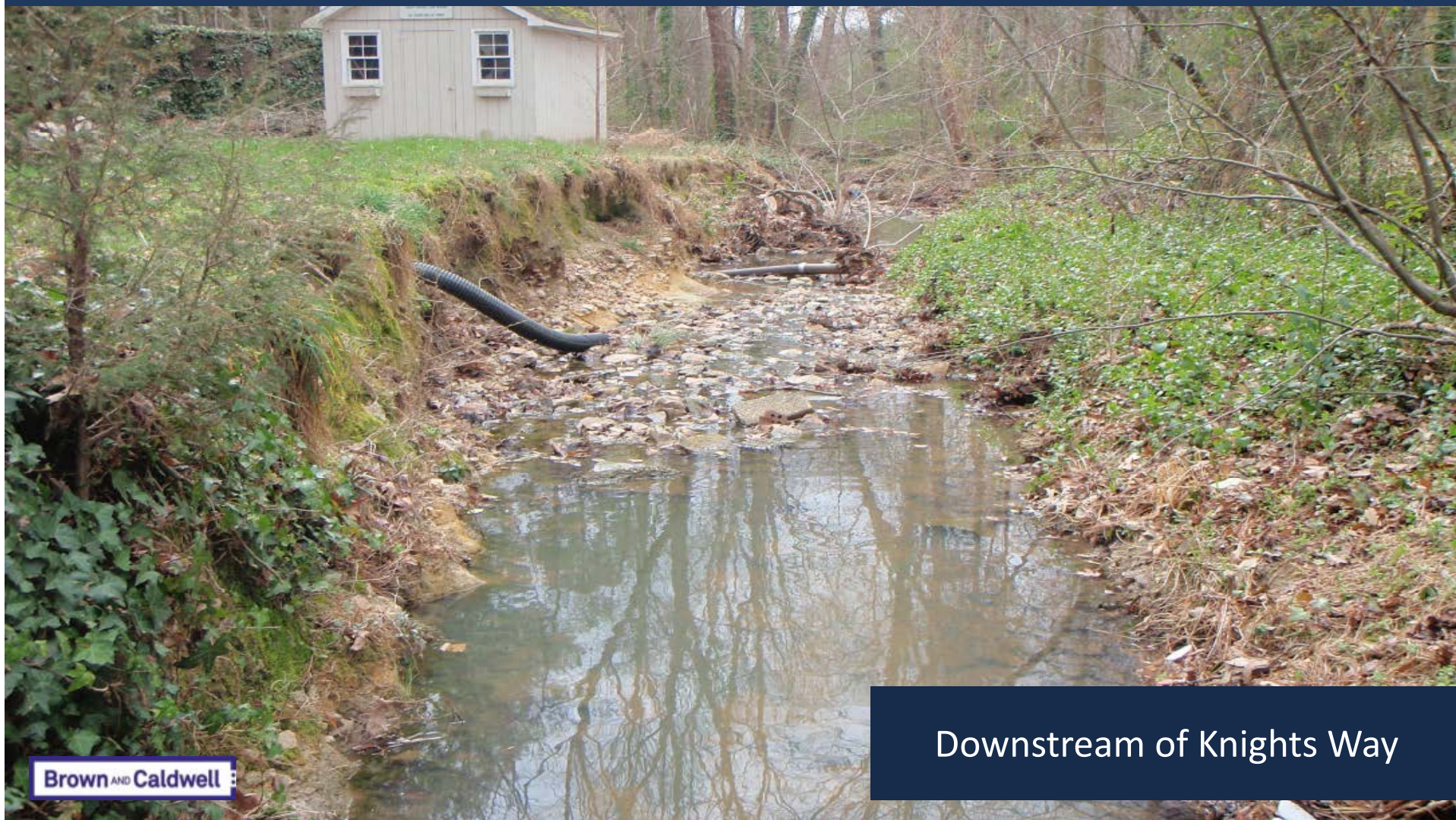
# Stream Stabilization



Stream near Wagram and  
Sandpiper Courts



# Stream Stabilization

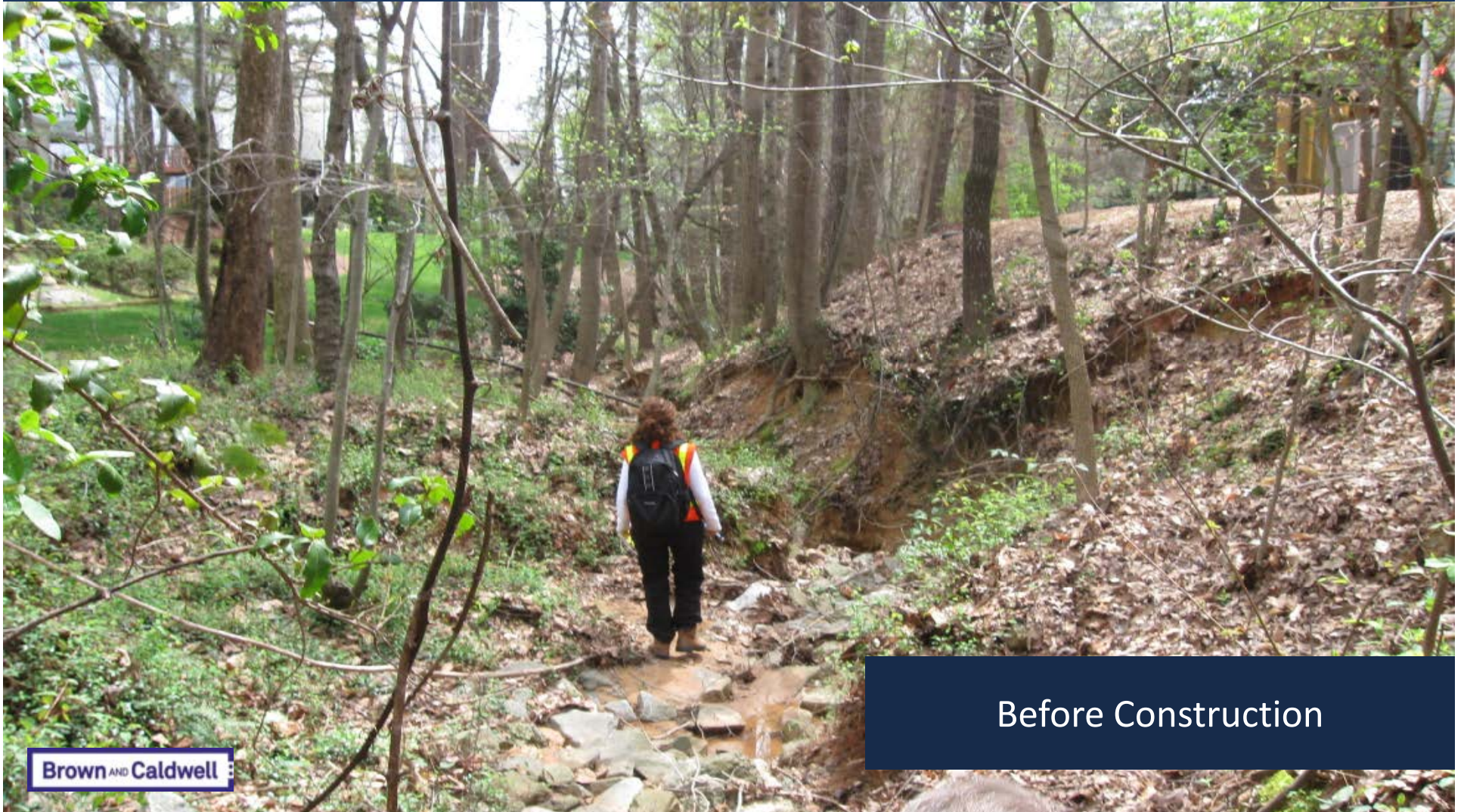


Downstream of Knights Way

Brown AND Caldwell



# Stream Stabilization - Example



Before Construction



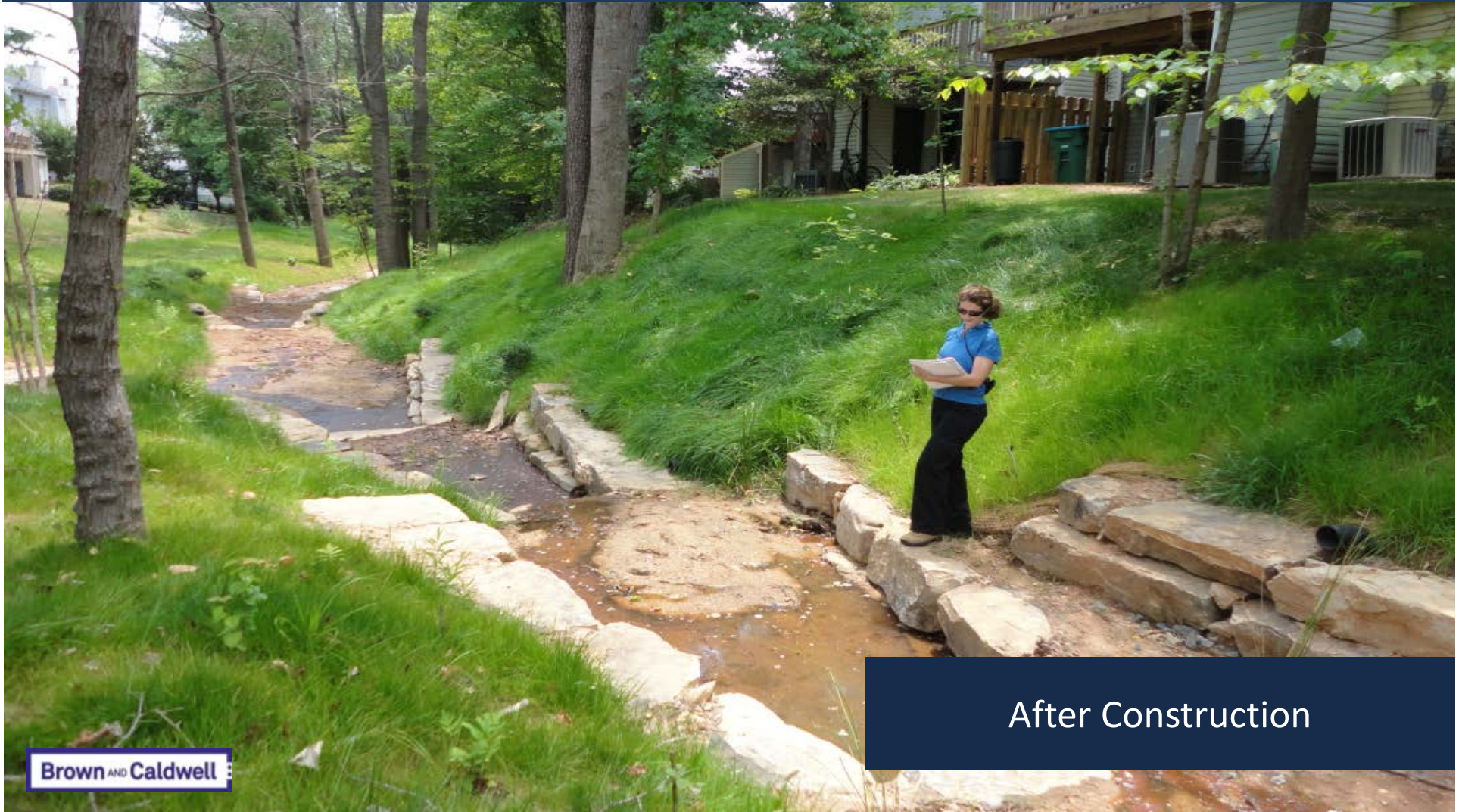
# Stream Stabilization - Example



During Construction



# Stream Stabilization - Example



After Construction







# Wagram Court (Bid Alternate)



## Current Conditions

- 18-inch and 24-inch stormwater pipe in the drainage system with open drainage area between Audubon and Laketree Drives
- Yard flooding (7901 Audubon Drive)

## Proposed Improvements for 10-year Level of Service

- Install 24-inch pipe from Laketree Drive to Audubon Drive/Wagram Court intersection
- New pipe outlet at 1317/1321 Wagram Court
- Keep 18-inch drainage system from Audubon Drive/Wagram Court intersection to existing outfall



# Wagram Court (Bid Alternate)



Brown AND Caldwell

Backyard between Laketree and  
Audubon Drives



# Anticipated Schedule



**Spring – Fall 2018: Design and Permitting**

**Summer/Fall 2018: Easement Acquisition**

**Fall 2018: Construction Bid (four months process)**

**Summer 2018 – Spring 2019: Private Utility Relocation**

**Winter 2019 – Spring 2020: Construction**



# Design and Permitting



- 90 percent design in progress and to be submitted for permit approval
- Permits required:
  - ✓ USACE 404 and NC DEQ 401 Permit
  - ✓ NC DEQ Erosion and Sedimentation Control Permit
  - ✓ City of Raleigh Concurrent Review (infrastructure/water/sewer)



# Easement Acquisition



- Easement Types
  - Temporary Construction Easement (TCE)
  - Permanent Sanitary Sewer Easement (PSE)
  - Permanent Drainage Easement (PDE)
- Easement Requirements
  - Public Utilities – No structures (sheds, fences, etc.) in sanitary sewer easement
  - Stormwater Management – Allow exceptions for fencing on a case-by-case basis



# Easements — Before Construction



Brown and Caldwell



# Easements – During Construction





# Easements – After Construction



Brown AND Caldwell



# Anticipated Schedule



**Spring – Fall 2018: Design and Permitting**

**Summer/Fall 2018: Easement Acquisition**

**Fall 2018: Construction Bid (four months process)**

**Summer 2018 – Spring 2019: Private Utility Relocation**

**Winter 2019 – Spring 2020: Construction**



# What to Expect During Construction



- Notifications
- Work Hours
- Traffic Control
- Access to Your Property
- Utility Service Connections
- Site Safety/Security
- Site Restoration



# Questions?



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